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ABSTRACT

This study applied a model of student academic motivation to an existing set of classroom data from 323 third graders in 17 classes from 2 Stanford, California elementary school districts. The model proposed that common forms of student-motivated behavior, such as task engagement, are systematically related to students' cognitive structures and their active inferences and interpretations as they initiate academic tasks. The application was a mechanism for increasing the understanding of a complex set of classroom variables and assessing hypothetical predictions from the model. The results showed that, within a given class, the higher the ability, the more self-esteem students exhibited relative to others in the class; that contextual factors had minimal influence on students' self-esteem; and, that changes in students' self-esteem did relate to their year-end academic performance. The analyses showed little variation across classes between pre- and post-test self-esteem. Results showed predicted relationships among student verbal ability, internality, self-esteem, and academic performance, as well as evidence that the average ability level of the class may alter such relationships. A more precise specification of cyclical models and an attempt to operationalize variables according to some real-world correspondence should permit more controlled assessments. (Author/PN)

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Applying a Theoretical Model of Academic Motivation to Classroom Data

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Running Head: Motivation Model

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Applying a Theoretical Model of Academic Motivation to Classroom Data

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Running Head: Motivation Model

Abstract

The study applied a model of student academic motivation to an existing set of classroom data at the third grade level. The application was a mechanism for (a) increasing understanding of a complex set of classroom variables, and (b) assessing hypothetical predictions from the model. Results showed predicted relationships among student verbal ability, internality, self-esteem, and academic performance, as well as evidence that the nature of the class group may alter such relationships. The discussion highlights difficulties involved in attempting to apply a new theoretical model to data not created for that purpose.

Applying a Theoretical Model of Academic Motivation to Classroom Data

As research on classrooms accumulates secondary analyses of data should become routine. Such analyses can facilitate research in a variety of ways. They are cost effective means for investigating post hoc research questions (often improving upon initial analysis schemes) (e.g., Page, 1981; Cronbach & Webb, 1975); they can aid in generating hypotheses for further direct investigation (e.g., Perl, 1979; Pointkowski, 1981); and they may serve as exploratory testing grounds for new theoretical models (e.g., Munro, 1981). The last of these possibilities was the point of departure for the present study. Our experience highlighted some specific difficulties with applying a theoretical model to existing data, which we here explicate for future such efforts.

Our substantive interest was a preliminary test of a theoretical model of classroom motivation. The model was developed to guide a research program on the topic, viewed from the perspective of cognitive control (deliberately regulating one's own thinking) (Corno, Note 1; Corno, Collins & Capper, Note 2). Applying the model to an available classroom data set was a convenient and inexpensive initial phase of research. We first describe the existing classroom data, then discuss the theoretical model of interest, our analyses, results, and conclusions.

The Classroom Data

Data were obtained from an experiment in the third grade (Crawford et al., Note 3) that investigated effects on student reading comprehension under two independent treatments: teacher training in empirically-derived teaching recommendations and parent-assisted instruction. While reading comprehension was the primary dependent variable in the study (both treatment variations were

designed to influence reading comprehension), selected measures of student self-appraisals were obtained as well. Reading comprehension was measured by a standardized test commonly used in elementary schools (described in a later section). Self-appraisal instruments included existing measures of self-esteem, anxiety, attitude, and locus of control. The Crawford team proposed no underlying relationships or common cognitive components among these student measures; nor did the research team explicitly link the measures through such component processes to specific features of the instructional treatments.

Not surprisingly, data originally analyzed at both class and individual levels revealed complex patterns of relationships among student aptitudes, the instructional treatments, and the various outcomes. Corno, Mitman & Hedges (1981), for example, reported treatment effects on the self-appraisal measures. Classes completing more of the parent-assisted instruction had higher mean scores on self-esteem and attitude than control classes, and lower mean scores on anxiety. These effects held when a relationship between amount of instruction completed and class general ability was taken into account. The confident conclusion was necessarily general: that a motivational advantage accompanied cognitive gains from treatment (see also Corno, 1980).

The present analysis was not concerned with treatment effects, but rather with a more detailed examination of relationships among a subset of the student measures--measures with some correspondence to the variables in the theoretical model of interest.

The Proposed Model of Student Motivation in Classrooms

Derived from cognitive-social psychology and research on instruction, the model of classroom motivation relates student cognitive and motivational

processes to specific aspects of classroom instruction, including academic tasks and teacher behavior (Corno, Note 1). The model proposes that common forms of student motivated behavior such as task engagement are systematically related to students' cognitive structures and their active inferences and interpretations as they initiate academic tasks. Appropriate prior knowledge and an academic self schema that permits access to that knowledge are seen as positive influences on performance expectations, compliant behavior, and consequently, achievement. Depending on the task situation, interpretations of and inferences made during task performance in turn may alter the academic knowledge base, indirectly affecting future expectations, behavior, and achievement in related tasks. A number of instructional and curricular manipulations may intervene in this process.

For example, a careful, step-by-step presentation of information coupled with demonstration and guided practice is evidence direct enough to raise success expectations in low achieving students (Schunk, 1981; Pulos & Linn, 1981; see also Bandura, 1977). Similarly, exhortations to apply more effort in academic tasks have been shown to alter student performance interpretations (attributions), which in turn are related to task persistence (Dweck, 1975; Andrews & Debus, 1978). The model is cyclical, with instruction and cognition interacting reciprocally to influence behavior, which in turn influences performance outcomes (after Bandura, 1978). Interpretations of performance can alter the cognitive structures and the cycle begins again. The model is depicted in Figure 1 below.

Insert Figure 1 about here

Various studies have documented key relationships in this model. In addition to the research mentioned above, relationships between attributions and expectations in school children have been discussed in reviews by Weiner (1976;1979), and studied more recently by a number of researchers (see Covington & Omelich, 1979; Covington & Beery, 1976;

Stipek & Hoffman, 1980; Ames & Ames, 1981; Wong & Weiner, in press). Studies of metacognition and cognitive-behavioral modification (Brown, 1978; Meichenbaum and Asarnow, 1979) have established the critical role of self-monitoring in a variety of achievement tasks. The link between time engaged in academic work and subsequent achievement has been documented by direct classroom investigations of teaching effectiveness discussed by Donham & Lieberman (1980), Rosenshine (1979), and Corno (1979). In general, discrete links appear established, but except for the teaching effectiveness studies, research has not been conducted in actual classroom situations. When they have been tested in the classroom, attempts to alter student cognition rarely capitalize on the teachers' experience and expertise, much less seek to integrate the intervention in a way that is consistent with the natural flow of classroom instruction.

What sorts of predictions would the model make for actual classroom situations? In a typical class lesson (where the information load is low and there is some logical structure), the interaction of relevant background knowledge, an understanding of specific lesson requirements, and a facilitating academic self schema should foster an expectation for success, which in turn should help avert negative attributions that may arise from perceived "failures" (e.g., incorrectly answering teachers' questions). Together these factors should favorably influence motivated behavior such as attention and engagement in the lesson. Various environmental factors may alter the predicted chain of events. If, for example, the average ability level of the class is higher than that of the student in question, or if the teacher fails to clarify task requirements or provide the student opportunities to make contact with critical information, success expectations may be lowered, impeding motivated behavior and ultimately achievement as well (e.g., Rosenholtz & Rosenholtz, 1981; Brophy & Good, 1974).

The basic difficulty in applying this proposed model to the existing data was

that we were unable to investigate such predictions directly. The available data were not obtained specific to certain class lessons and the student measures were not clear operationalizations of the variables in the model. In addition, classroom process data used to measure task engagement were scant for individual students. Only four, five-minute observations were made on each individual student over the year of the study, and no other measures (such as number of reading assignments completed) were available. Despite these problems, it seemed that the character of the data (e.g., students nested within classes) and selected student measures could be used to investigate aspects of the theoretical framework.

Comparison of Selected Student Measures and Model Variables

Attributions. The proposed model assumes performance attributions to vary on several major causal dimensions--perceived locus of causality (internal vs. external), stability (stable vs. unstable), controllability (by the individual or by someone else), and globality (specific to the task at hand or more generalizable) (Weiner, 1979). Additionally, the student may provide one or more reasons for an observed performance, and those reasons may be conceived as having different dimensional characteristics by different individuals (Metalsky & Abramson, 1981). There is controversy among researchers over effective means of measuring performance attributions, particularly with children (Kendall, Pellegrini, & Urbain, 1981).

The attribution measure obtained for the third grade study was a modified version of the Intellectual Achievement Responsibility Scale (Crandall, Katkovsky and Crandall, 1965) developed by Stallings & Kaskowitz (1974). This measure examines students' explanations for hypothetical successes and failures in a variety of academic situations. In particular, items assess the extent to which

a student tends to attribute successes and failures to two internal factors (ability or effort) or two external factors (luck or the teacher). The measure does not distinguish between locus of causality and controllability (Weiner, 1979), nor does it require the student to make a subjective interpretation of the various causal dimensions placed on specific attributions. Twenty of the 34 items in the adapted version were adminstered, 10 from the "success" subscale and 10 from the "failure" subscale. Items were read aloud by experimenters to class groups. Alpha reliabilities for the subscales at pretest were only .40 (success) and .48 (failure). These were computed at the individual level.

Academic self schema. The motivation model posits that students form a cognitive "network of associations" about themselves relative to the academic situations they encounter (Mischel, 1979). This network, or academic self schema, is formed in part on the basis of observation (e.g., observing oneself and others handling academic tasks) and in part through persuasion (e.g., through others' statements). In both instances it is the individual's interpretation of the situation that is stored. So a student might store the interpretation that "I'm not good at math" after repeated failures on math exams. Stored interpretations may also take on dispositional qualities if similar persuasive statements are internalized across various unrelated situations, e.g, "I'm lazy" (Kelley, 1972). These self-appraisals have a metacognitive character; that is, they reflect personal judgments about one's own ability or knowledge. As assessments of one's own cognitive capabilities, these aspects of the self schema are comprised by Flavell's (1981) concept of "metacognitive knowledge"--that part of long term memory which holds impressions of what the individual is like in various roles--in this case, as a student.

As with the available measure of attributions, the available measure of academic self-esteem was a less than adequate representation of the overall academic self schema. The measure tapped global self-appraisals across a

variety of situations, not all of which were directly relevant to school or academic work. Also, situational vs. dispositional appraisals were not systematically included in the items, and academic prototypes used as personal standards (e.g. views of the teacher) (Cantor & Mischel, 1979) were not measured. One item relevant to school in general was "I'm proud of my school work." One less relevant item which was also dispositional was "I'm not fun to be with." The measure was a shortened version of the Coopersmith Self-Esteem Inventory (Coopersmith, 1967), consisting of 26 of the original 58 items. A score was the total number of items answered in the direction indicating positive self-esteem. The pretest alpha reliability on individual student scores was .73.

Relevant background knowledge and classroom performance. The motivation model specifies complex reciprocal relationships between a student's existing knowledge of a subject and the manner in which he or she approaches a related task. The combination of a limited knowledge base and a non-facilitative self-schema, for example, would make difficult both the active interrogation of new information (Resnick, 1981) and executive control (i.e., interpretation and monitoring of that process). Yet, it is precisely these active processes which expand and enrich both knowledge bases after all (Anderson, 1978; Reder, 1979, Bandura, 1980). It is the active involvement with the materials typically measured as engaged or constructive behavior (e.g., Berliner, 1979) which directly improves the performance (see also Wittrock, 1978; Bower & Black & Turner, 1979).

The available measures of student background knowledge for this study (hereafter called general verbal ability) (Snow, 1976) were commonly-used academic achievement tests in reading comprehension and vocabulary appropriate

for the third grade. Vocabulary was measured by Form I (Levels A-C) of the vocabulary subtest of the Cognitive Abilities Test (Thorndike & Hagen, 1971). Reading comprehension was measured by selected items from the reading subscale (Test 2) of the Metropolitan Achievement Test, Elementary Forms F and G (Durost, Bixler, Wrightstone, Prescott & Balow, 1970). Individual scores on the vocabulary and reading pretests were standardized on the total sample and summed to form a verbal ability composite for each student. Individual level alpha reliabilities for the two measures were .78 and .82 for vocabulary and reading comprehension, respectively. This verbal ability index was considered a close operationalization of the background construct in the theoretical model.

As we mentioned previously, no measure of success expectations was available, nor was there a reliable measure of student cognitive engagement or motivated behavior. The available measure of student reading achievement was the posttest score on the same reading test given at pretest, except that the posttest was a parallel form. As a norm-referenced test, this instrument was designed to provide a relatively stable measure of student achievement over time. That is, it was not expected that students given instructional treatment would improve dramatically on this test. The test was also designed to distribute students along the scale, rather than distinguish reliably among students who had mastered or not mastered new material. Again, the available measure was an indirect operationalization of the variable in the model.

The model requires a criterion-referenced performance measure that has the qualities described as lacking in norm-referenced tests and is specifically designed to assess aspects of reading comprehension taught in sample classes. Some classes may teach paragraph analysis, for example, while others may teach

discourse analysis. These comprehension processes can be differentially assessed so that any standardized measure of global reading comprehension does not necessarily tap both skills (Calfee & Spector, 1981).

Given these various conceptual mismatches between the theoretical model of interest and the available data set, it is clear that empirical denial of any compromise predictions would not necessarily disconfirm the proposed model. With this in mind, some compromise predictions consistent with the proposed theoretical framework were formed as follows:

1. If performance attributions can influence academic self-esteem, students who tend to attribute academic successes to themselves should also exhibit higher academic self-esteem than students who do not. The opposite prediction was not offered for attributions concerning failure since failure attributions to self can be facilitative if viewed as controllable (e.g., learning from mistakes), and controllability was not assessed. Consequently, failure attributions were expected to show no reliable association with self-esteem.
2. If the academic self schema is formed in part by past academic experiences, students who have higher verbal ability (and therefore have had more success experiences in reading) should also have higher academic self-esteem.
3. If the academic self schema is formed in part by observations of one's own performance relative to the social-task situation at hand, low ability students in higher ability classes should exhibit lower self-esteem than high ability students. Put differently, students of lower ability relative to others in a class should have lower acadmic self-esteem than their classmates of higher relative ability.

4. If the behavior of significant others (here teachers and peers) contributes to the formation of the academic self schema, there should be more between-class variation in academic self-esteem at the end of the school year than at the beginning.
5. If changes in the academic self schema exert any (indirect) influence on student academic performance, pre-post differences in student self-esteem should relate to year-end reading performance.

Sample

Subjects were 323 third graders in 17 classes obtained from two public elementary school districts near Stanford University. Schools, located in predominantly middle to upper-middle class neighborhoods, were confounded in the initial design such that classes were sampled from the two districts relatively evenly, without regard to schools. The 323 students used in the present study consisted of half the existing sample, the half that received instructional treatment. This decision was justified by an intention to control any non-random sampling differences between subjects that may have been treatment related, and to accomodate to some extent the post hoc character of the analysis. The final series of analyses could be conducted on the "other half" of the total sample on some future date to compare results.

Results

Our analyses focused on the expected relationships outlined. Our first prediction was that students who internalize academic successes also should exhibit higher academic self-esteem than students who do not. The data supported this expectation: The correlation between the measures was .31

Helwig & Cauncil, 1979) was used to perform two-way analyses of variance (ANOVAs), corrected for unbalanced cells. The two-way ANOVAS used factors of ability by internality with the self-esteem pretest as the dependent variable. ANOVAs were computed on the total sample and separately for high and low ability classes, respectively. A summary of significant results appears in Table 1.

Insert Table 1 about here

In the total sample analyses there were significant differences in self-esteem across ability groups for both attribution dimensions. The main effect for verbal ability was significant when crossed with both internalized failure ($F(1,319) = 21.52$, $p < .001$) and success ($F(1,319) = 18.09$, $p < .001$). The main effect for internalized failure was not significant, while the main effect for internalized success was significant. Thus higher ability students had higher self-esteem, but self-esteem was also higher for students who internalized success ($F(1,319) = 18.09$, $p < .01$). Table 2 presents the descriptive statistics by groups.

Insert Table 2 about here

The bottom halves of Tables 1 and 2 present results of similar analyses run on the separate groups of high and low ability classes. These analyses investigated our third prediction regarding differential self-esteem within different class groups. In high ability classes only the verbal ability factor significantly affected self-esteem ($F(1,122) = 7.01$, $p < .01$ when KAB was crossed with IFGR and $F(1,122) = 6.80$, $p < .05$ when KAB was crossed with ISGR). In

these high ability classes, students with lower verbal ability had lower self-esteem. This result supports one aspect of our third prediction. The low ability classes showed the same significant ability main effect ($F(1,98) = 6.13$, $p < .05$) but only in the IFGR design. In the ISGR design the significant effect was for internalized success ($F(1,98) = 6.23$, $p < .05$). Students who internalized success had higher self-esteem than those who did not. It may be, as our theoretical model predicts, that some aspect of high or low ability classroom dynamics (here unmeasured) can alter the nature of relationships among student ability, success attributions, and self-esteem. Our results are only suggestive in this regard.

Our third prediction was, once again, that if students are making social comparisons of performance, self-esteem should be lowest for low ability students in high ability classes (i.e., students of lower relative ability should have lower self-esteem). Results thus far have been supportive. Another analysis was run in which self-esteem was regressed on general ability for the total sample (using within-class deviation scores--individual student scores deviated from the class mean). This analysis is another way of gaining information on how well individual students performed relative to other students in the class. Positive deviation scores indicate higher than average performance on each measure, while negative deviation scores indicate lower than average performance. Results showed students of lower relative ability had lower self-esteem than students of higher relative ability ($F(1,321) = 7.57$, $p < .01$; $r = .15$). Consistent with the foregoing analyses it appeared that, within a given class, the higher the ability, the more self-esteem students exhibited relative to others in the class.

The fourth prediction addressed the magnitude of between-class effects. If contextual factors, such as the nature of the group and the instruction, are important influences on students' knowledge of themselves as students, there should be between-class variance in self-esteem from pre- to posttest.

The first type of analysis used to address this question was a series of pre-post scatterplots on self-esteem for each of the 17 sample classes. Regression results are presented in Table 3.

Insert Table 3 about here

Though the correlations vary somewhat across classes, wide variation was not evident. On the whole, there were strong positive relationships between the pre- and post-measures of self-esteem, indicating that students who initially exhibited high self-esteem tended to continue to do so at posttest. Only one class showed no significant relationship between the pre- and post-measures of self-esteem (r = .31 for Class 16). The highest correlation was found in Class 5 (r = .79).

Analyses of variance accounting for the unbalanced design also were performed on pre- and posttest self-esteem, as well as on self-esteem pre-post difference scores. The pretest ANOVA showed no significant differences across classes (F (1,321) = 0.85, n.s.). Classes began the year approximately uniform in self-esteem. Similarly the posttest ANOVA showed no significant differences across classes (F (1,321) = 2.47, n.s.). Consistent with these results, the analysis of self-esteem difference scores yielded nonsignificant

results (F (1,321) = 0.67 n.s.). Across the 17 classes, then, no significant differences were found for initial, follow-up, or gain in self-esteem.

Descriptively, changes in self-esteem across classes ranged from a loss of 12 to a gain of 9 points. The mean and median change was .27 points with a standard deviation of 3.81. Of the 323 students in 17 classes, 47 percent (n = 136) lost in self-esteem, 48 percent (n = 154) gained, and 10 percent (n = 32) remained stable. Class 14 gained an average of 2.42 points, while class 2 lost 1.80 points. Table 4 presents the descriptive statistics for the pre- and post-measures of self-esteem across classes.

Insert Table 4 about here

Averaging over subjects within classes, self-esteem decreased in eight instances and increased in nine. The proportion of students who gained or lost self-esteem varied across classes, as did the strength and significance of the pre-post relationships, even though tests of between-class variation indicated no significant differences across classes on the self-esteem measures. These results suggest that contextual factors had but minimal influence on students' self-esteem.

The final prediction was that pre-post differences in self-esteem would correspond closely to students' year-end academic performance. Regressions and scatterplots were run for academic performance on self-esteem differences and reading comprehension. Results showed existing changes in self-esteem were related to year-end reading comprehension (F(1,321) = 9.16, $p < .01$; r = .16). Thus the final prediction was supported: Changes in students' self-esteem did relate to their year-end academic performance.

Summary and Discussion

The analyses conducted showed some support for our theoretical predictions. Students with more self-esteem tended to have more positive performance histories in the subject area studied than students with less self-esteem, and were also more likely to have internalized their successes. Tendencies to internalize failures were not related to performance histories or self-esteem, perhaps because the attribution instrument used was not able to distinguish internalized failures along the dimension of controllability.

Differences were evidenced on self-esteem between students of low and high relative ability within both high and low ability classes. In both types of classes students with lower verbal ability had lower self-esteem. While this suggests that the character of class groups did not affect student self-esteem, an interesting result was noted in the low ability classes, where attribution tendencies, as well as ability, explained some of the variance in self-esteem. In this sample most of the mediating effect attributions had on the observed relationship between verbal ability and self-esteem took place in low ability classes. Apparently there are some differences in the dynamics of high and low ability classes which may somehow alter the nature of relationships among the student variables studied. This investigation did not assess such classroom dynamics nor did it attempt to explore the alteration process. Readers are referred to recent research by Noreen Webb (1980; Note 4) as an intriguing departure from this point.

Our analyses showed little variation across classes in the relationship between pre- and posttest self-esteem. Students who initially exhibited high self-esteem tended to continue to do so at posttest, regardless of class membership. Some classes showed greater average gains and losses in self-esteem

than others, but again, these results were not statistically significant. Other, more direct, means should be explored for assessing the contributions significant others such as teachers and peers may make to the development of students' academic self schemata. The changes that did occur in the self-esteem mechanism were related to academic performance in this study, and ought not, therefore, to be disregarded.

Conclusions from this study are constrained by the post hoc nature of the analyses and the indirect operationalization of theoretical constructs. As mentioned, the same set of analyses reported here should be run on the remaining half of the sample to further support or refute assessed relationships. Despite these limitations, and considering also the relatively low reliability of the attribution measures used, some theoretically meaningful trends were evidenced, trends that supported some predictions from modern theories of motivation in actual classroom data.

Generally speaking, predicted relationships were found among students' verbal ability, attributional tendencies, self-esteem, and academic performance. These relationships appeared irrespective of particular academic tasks and teacher factors. There was some evidence, however, that the average ability level of a class may play a mediating role in the observed relationship among individual students' ability, attributions, and self-esteem. Perhaps through social comparisons and self-observations, high ability students in high ability classes, for example, are able to accrue self-confidence despite internalized failures. Their perceived (and actual) ability may "compensate" for potential deleterious effects of internalized failure (Salomon, 1979). Alternatively, these students might have been viewing their internalized failures as controllable; the attribution measure used could not provide this information. Though

influence ought to be stronger in one direction than in the other, probably in the direction that makes the most causal "sense," such as in temporal order. Moreover, some multivariate analysis techniques were devised, in part, to take into account the fact that variables in complex systems are intercorrelated, and to help tease such patterns of correlation apart. A more precise specification of our cyclical models and an attempt to operationalize variables according to some real-world correspondences (i.e., operations that make sense, say, in classroom tasks of a certain type) should permit more controlled assessments than the one conducted here. Rather than spurring educational researchers to give up their quest, perhaps Cronbach's challenge has made theoretical research in education more of a possibility than it may have been otherwise.

Reference Notes

1. Corno, L. Moving out of the starting gate: A classroom intervention in academic motivation. National Institute of Education grant No. 10246 pending funding October, 1981.

2. Corno, L., Collins, K. M., & Capper, J. Where there's a way there's a will: Self-regulating the low achieving student. Paper submitted for presentation at the meeting of the American Educational Research Association, April, 1982, New York City.

3. Crawford, W. J., Gage, N. L., Corno, L., Stayrook, N. G., Mitman, A. L., Schunk, D. H., & Stallings, J. An experiment on teacher effectiveness and parent-assisted instruction in the third grade (Vols. 1-3). Palo Alto, CA.: Center for Educational Research at Stanford, 1978.

4. Webb, N. & Cullian, L. Personality and ability correlates of group interaction and achievement in smaller groups. Paper presented at the meeting of the American Educational Research Association, Los Angeles, 1981.

5. Cronbach, L. J. with the assistance of J. E. Deken & N. Webb. Research on classrooms and schools: Formulation of questions, design, and analysis. (Occasional Paper of the Stanford Evaluation Consortium). Palo Alto, CA.: Stanford University School of Education, 1976.

6. Collins, J. Ability and efficacy in achievement behavior. Unpublished doctoral dissertation. Stanford University School of Education, in progress.

References

Ames, C. & Ames, R. Competitive versus individualistic goal structures: The salience of past performance information for causal attributions and affect. Journal of Educational Psychology, 1981, 73, 411-419.

Anderson, R. C. The notion of schemata and the educational enterprise. In R. C. Anderson, R. J. Spiro, & W. E. Montague (Eds.), Schooling and the acquisition of knowledge. Hillsdale, N.J.: Erlbaum, 1978.

Andrews, G. R. & Debus, R. L. Persistence and the causal perception of failure: Modifying cognitive attributions. Journal of Educational Psychology, 1978, 70, 154-167.

Bandura, A. Self-efficacy: Toward a unifying theory of behavioral change. Psychological Review, 1977, 84, 191-215.

Bandura, A. The self system in reciprocal determinism. American Psychologist, 1978, 33, 348-358.

Bandura, A. The self and mechanisms of agency. In J. Suls (Ed.), Social psychological perspectives on the self. Hillsdale, N.J.: Erlbaum, 1980.

Berliner, D. C. Tempus educare. In P. L. Peterson & H. J. Walberg (Eds.), Research on teaching. Berkeley, CA.: McCutchan, 1979.

Bower, G. H., Black, J. B. & Turner, T. J. Scripts in memory for text. Cognitive Psychology, 1979, 11, 177-220.

Brophy, J. E. & Good, T. L. Teacher-student relationships. N.Y.: Holt, Rinehart & Winston, 1974.

Brown, A. L. Knowing when, where, and how to remember: A problem of metacognition. In R. Glaser (Ed.), Advances in instructional psychology, Vol. I. Hillsdale, N.J.: Erlbaum, 1978.

Calfee, R. C. & Spector, J. E. Separable processes in reading. In F. J. Pirozzolo & M. C. Wittrock (Eds.), Neuropsychological and cognitive processes in reading. N.Y.: Academic Press, 1981.

Cantor, N. & Mischel, W. Prototypes in person perception. In L. Berkowitz (Ed.), Advances in experimental social psychology (Vol. 12). N.Y.: Academic Press, 1980.

Cooper, H. M. Pygmalion grows up: A model for teacher expectation communication and performance influence. Review of Educational Research, 1979, 49, 389-411.

Coopersmith, S. (Ed.), Coopersmith self-esteem inventory. The antecedents of self-esteem. San Francisco: W. H. Freeman, 1967.

Corno, L. Classroom instruction and the matter of time. In D. L. Duke (Ed.), Classroom management. Chicago: University of Chicago Press, 1979.

Corno, L. Individual and class level effects of parent-assisted instruction in classroom memory support strategies. Journal of Educational Psychology, 1980, 72, 278-292.

Corno, L., Mitman, A. L., & Hedges, L. V. The influence of direct instruction on student self-appraisals: A hierarchical analysis of treatment and aptitude-treatment interaction effects. American Educational Research Journal, 1981, 18, 39-61.

Covington, M. V. & Beery, R. G. Self-worth and school learning. N.Y.: Holt, Rinehart, & Winston, 1976.

Crandall, V. C., Katkovsky, W. & Crandall, V. J. Children's beliefs in their own control of reinforcements in intellectual-academic achievement situations. Child Development, 1965, 36, 91-106.

Cronbach, L. J. Beyond the two disciplines of scientific psychology. American Psychologist, 1975, 30, 116-128.

Cronbach, L. J. & Webb, N. Between-class and within-class effects in a reported aptitude x treatment interaction: Reanalysis of a study by G. L. Anderson. Journal of Educational Psychology, 1975, 67, 717-725.

Doyle, W. Making managerial decisions in classrooms. In D. Duke (Ed.), Classroom management. Chicago: University of Chicago Press, 1979.

Denham, C. & Lieberman, A. (Eds.), Time to learn. Washington D. C.: National Institute of Education, 1980.

Durost, W. N., Bixler, H. W., Wrightstone, J. W., Prescott, G. A., & Balow, I. H. Metropolitan achievement test, Form F. Test 2: Reading. N.Y.: Harcourt Brace Jovanovich, 1970.

Dweck, C.S. The role of expectations and attributions in the alleviation of learned helplessness. Journal of Personality and Social Psychology, 1975, 31, 674-685.

Flavell, J. H. Cognitive monitoring. In W. P. Dickson (Ed.), Children's oral communication skills. N.Y.: Academic Press, 1981.

Helwig, J. T. & Cauncil, K. (Eds.), Users guide to SAS. Raleigh, N.Ca.: SAS Institute, 1979.

Hermans, H. J. M. A questionnaire measure of achievement motivation. Journal of Applied Psychology, 1970, 54, 353-363.

Kelley, H. H. Causal schemata and the attribution process. In E. E. Jones, D. E. Kanouse, H. H. Kelley, R. E. Nisbett, S. Valins, & B. Weiner (Eds.), Attribution: Perceiving the causes of behavior. Morristown, N.J.: General Learning Press, 1972.

Kendall, P. C., Pellegrini, D. S., & Urbain, E. S. Approaches to assessment for cognitive-behavioral interventions with children. In P. C. Kendall & S. D. Hollon (Eds.), Assessment strategies for cognitive-behavioral interventions. N.Y.: Academic Press, 1981.

McClelland, D. C. Toward a theory of motive acquisition. American Psychologist, 1965, 20, 321-333.

Meichenbaum, D. & Asarnow, J. Cognitive-behavioral modification and metacognitive development: Implications for the classroom. In P. C. Kendall & S. D. Hollon (Eds.), Cognitive-Behavioral Interventions. N.Y.: Academic Press, 1979.

Metalsky, G. I & Abramson, L. Y. Attributional styles: Toward a framework for conceptualization and assessment. In P. C. Kendall & S. D. Hollon (Eds.), Assessment strategies for cognitive-behavioral interventions. N.Y.: Academic Press, 1981.

Mischel, W. On the interface of cognition and personality: Beyond the person-situation debate. American Psychologist, 1979, 34, 740-755.

Munro, B. H. Dropouts from higher education: Path analysis of a national sample. American Educational Research Journal, 1981, 18, 133-141.

Page, E. B. Effects of U. S. private schools: A technical analysis of two recent claims. Educational Researcher, in press, 1981.

Perl, T. H. Discriminating factors and sex differences in electing mathamatics. Unpublished doctoral dissertation, Stanford University, 1979.

Pointkowski, D. A structural analysis of reading instruction and the acquisition of beginning reading skills. Unpublished doctoral dissertation, Stanford University, 1981.

Pulos, S. & Linn, M. C. Generality of the controlling variable scheme in early adolescence. Journal of Early Adolescence, 1981, 1, 29-36.

Raven, J. C. Raven's standard progressive matrices. N.Y.: Psychological Corp., 1958.

Reder, L. M. The role of elaboration in the comprehension and retention of prose: A critical review. Review of Educational Research, 1980, 50, 5-55.

Resnick, L. B. Instructional psychology. In M. R. Rosenzweig & L. W. Porter (Eds.), Annual review of psychology (Vol. 32). Palo Alto, CA.: Annual Reviews, 1981.

Rosenholtz, S. J. & Rosenholtz, S. H. Classroom organization and the perception of ability. Sociology of Education, 1981, 54, 132-140.

Rosenshine, B. V. Content, time, and direct instruction. In P. L. Peterson & H. Walberg (Eds.), Research on teaching. Berkeley, CA.: McCutchan, 1979.

Salomon, G. Media and symbol systems as related to cognition and learning. Journal of Educational Psychology, 1979, 71, 131-149.

Schunk, D. H. Modeling and attributional effects on children's achievement: A self-efficacy analysis. Journal of Educational Psychology, 1981, 73, 93-106.

Snow, R. E. Research on aptitude for learning: A progress report. In L. S. Shulman (Ed.), Review of Research in Education (Vol. 4). Itasca, IL: Peacock, 1976.

Stallings, J. A. & Kaskowitz, D. H. Follow through classroom observation evaluation 1972-1973 (U. S. Office of Education Contract OEC-0-8522480-4663(100)). Menlo Park, CA.: SRI International, 1974. (ERIC Document Repro. No. ED 104 969)

Stipek, D. J. & Hoffman, J. M. Children's achievement-related expectancies as a function of academic performance histories and sex. Journal of Educational Psychology, 1980, 72, 861-866.

Thorndike, R. L. & Hagen, E. Cognitive abilities test (examiner's manual). Boston: Houghton Mifflin, 1971.

Webb, N. M. A process-outcome analysis of learning in group and individual settings. Educational Psychologist, 1980, 15, 69-84.

Weiner, B. Attribution theory, achievement motivation, and the educational process. Review of Educational Research, 1976, 42, 201-215.

Weiner, B. A theory of motivation for some classroom experiences. Journal of Educational Psychology, 1979, 71, 3-25.

Weiner, B. Human motivation. N.Y.: Holt, Rinehart & Winston, 1980.

Wittrock, M. C. The cognitive movement in instruction. Educational Psychologist. 1978, 13, 15-31.

Wong, R. T. P. & Weiner, B. When people ask why questions and the heuristics of attributionsl search. Journal of Personality and Social Psychology, in press.

Footnotes

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Table 1

Summary of the Significant Effects from the Analyses of Variance on Self-Esteem

Analysis	Source	F	df	P
Total Sample				
KAB X IFGR	KAB	21.52	1,319	.001
KAB X ISGR	KAB	18.09	1,319	.001
High Ability Classes				
KAB X IFGR	KAB	7.01	1,122	.01
KAB X ISGR	KAB	6.80	1,122	.05
Low Ability Classes				
KAB X IFGR	KAB	6.13	1,98	.05
KAB X ISGR	ISGR	6.23	1,98	.05

Note. KAB = verbal ability composite groups

IFGR = internalized failure groups

ISGR = internalized success groups

Table 2

Means on Student Self-Esteem by Ability and Internality

Ability Group	Internality			
	Failure		Success	
	High	Low	High	Low
Total Sample				
High	19.44	19.77	20.28	18.55
Low	17.04	17.99	17.94	17.10
High Ability Classes				
High	20.05	19.86	20.54	19.14
Low	17.69	17.91	17.29	18.32
Low Ability Classes				
High	18.67	20.62	20.53	17.33
Low	17.00	17.67	17.86	16.81

Table 3

Descriptive Statstics and Simple Regressions for
Change in Self-Esteem Across Classes

Class	N	M	S.D.	Pre-Post r	b[a]	S.E. β
1	26	1.23	4.07	.58	.61	3.79
2	20	-1.80	3.58	.52	1.07	3.67
3	13	-0.15	3.65	.64	.70	3.58
4	25	0.12	3.13	.78	.84	3.10
5	20	2.35	2.80	.79	.77	2.68
6	23	0.78	4.37	.48	.33	2.99
7	19	0.26	3,93	.71	.93	3.31
8	19	0.21	3.62	.52	.45	2.99
9	23	-0.13	3.20	.63	.86	3.24
10	16	-0.63	4.29	.58	.65	4.15
11	21	1.00	3.81	.62	.65	3.59
12	19	0.37	3.86	.71	.63	3.40
13	11	-0.91	3.11	.71	.74	3.10
14	21	2.43	2.84	.66	.72	2.75
15	17	-1.12	4.61	.59	.86	4.73
16	12	-1.12	5.19	.31	.39	4.86
17	18	-0.39	3.99	.49	.48	3.52
Overall	323	0.27	3.81	.50**		

[a] b is the unstandardized regression coefficient.

** $p < .01$

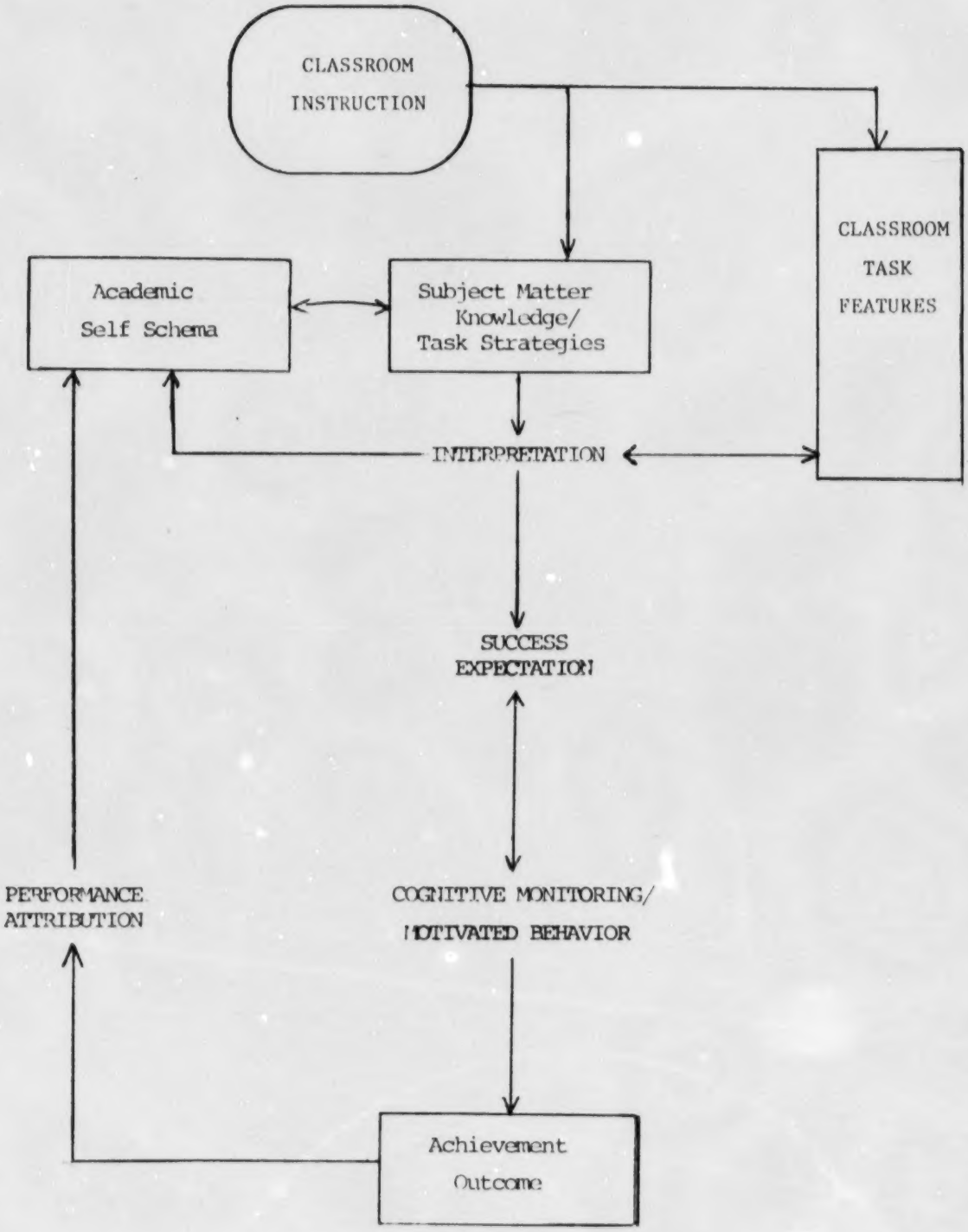
Table 4

Means and Standard Deviations for
Pre- and Post-Measures of Self-Esteem

Class	N	Pre-Test Self-Esteem		Post-Test Self-Esteem	
		M	S.D.	M	S.D.
1	26	18.19	4.29	19.42	4.54
2	20	20.80	2.04	19.00	4.19
3	13	19.62	4.07	19.46	4.45
4	25	18.76	4.54	18.88	4.86
5	20	18.15	4.33	20.50	4.22
6	23	17.56	4.84	18.35	3.32
7	19	18.89	3.49	19.16	4.58
8	19	18.26	3.90	18.47	3.39
9	23	20.56	3.00	20.43	4.08
10	16	17.81	4.38	17.19	4.93
11	21	16.43	4.28	17.43	4.47
12	19	19.59	5.34	19.95	4.70
13	11	15.27	3.95	14.36	4.15
14	21	17.48	3.25	19.90	3.55
15	17	19.29	3.85	18.18	5.66
16	12	18.92	3.82	17.75	4.86
17	18	19.11	3.97	18.72	3.91
Overall	323	18.56	4.14	18.83	4.43

Figure Caption

Figure 1. A Model of Student Motivation in Classrooms (after Corno, Note 1).


CLASSROOM
INSTRUCTION
CLASSROOM
TASK
FEATURES
Academic
Self Schema
Subject Matter
Knowledge/
Task Strategies
INTERPRETATION
SUCCESS
EXPECTATION
PERFORMANCE
ATTRIBUTION
COGNITIVE MONITORING/
MOTIVATED BEHAVIOR
Achievement
Outcome